

CLAIMS

1. A photosensitive resin composition for forming a laser engravable printing element, comprising:

5 (a) 100 parts by weight of a resin which is in a solid state at 20 °C, wherein said resin has a number average molecular weight of from 5,000 to 300,000,

(b) 5 to 200 parts by weight, relative to 100 parts by weight of said resin (a), of an organic compound having a number average molecular weight of less  
10 than 5,000 and having at least one polymerizable unsaturated group per molecule, and

(c) 1 to 100 parts by weight, relative to 100 parts by weight of said resin (a), of an inorganic porous material having an average pore diameter of from  
15 1 nm to 1,000 nm, a pore volume of from 0.1 ml/g to 10 ml/g and a number average particle diameter of not more than 10  $\mu\text{m}$ .

20 2. The photosensitive resin composition according to claim 1, wherein said inorganic porous material (c) has a specific surface area of from 10  $\text{m}^2/\text{g}$  to 1,500  $\text{m}^2/\text{g}$  and an oil absorption value of from 10 ml/100 g to 2,000 ml/100 g.

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3. The photosensitive resin composition according to claim 1 or 2, wherein at least 30 % by weight of said resin (a) is at least one resin selected from the group consisting of a thermoplastic resin having a softening  
5 temperature of 500 °C or less and a solvent-soluble resin.

4. The photosensitive resin composition according to any one of claims 1 to 3, wherein at least 20 % by  
10 weight of said organic compound (b) is a compound having at least one functional group selected from the group consisting of an alicyclic functional group and an aromatic functional group.

15 5. The photosensitive resin composition according to any one of claims 1 to 4, wherein said inorganic porous material (c) is a spherical particle or a regular polyhedral particle.

20 6. The photosensitive resin composition according to claim 5, wherein at least 70 % of said inorganic porous material (c) is a spherical particle having a sphericity of from 0.5 to 1.

25 7. The photosensitive resin composition according to

claim 5, wherein said inorganic porous material (c) is a regular polyhedral particle having a  $D_3/D_4$  value of from 1 to 3, wherein  $D_3$  represents the diameter of a smallest sphere which encloses said regular polyhedral particle therein and  $D_4$  represents the diameter of a largest sphere which is enclosed in said regular polyhedral particle.

8. The photosensitive resin composition according to any one of claims 1 to 7, which is for use in forming a relief printing element.

9. A laser engravable printing element produced by a process comprising:

shaping the photosensitive resin composition of any one of claims 1 to 7 into a sheet or cylinder, and crosslink-curing said photosensitive resin composition by light or electron beam irradiation.

10. A multi-layered, laser engravable printing element comprising a printing element layer and at least one elastomer layer provided below the printing element layer, wherein said printing element layer is made of the laser engravable printing element of claim 9 and said elastomer layer has a Shore A hardness of from 20

to 70.

11. The multi-layered, laser engravable printing element according to claim 10, wherein said elastomer  
5 layer is formed by photocuring a resin which is in a liquid state at 20 °C.

12. A method for producing a laser engraved printing element, which comprises:

- 10 (i) forming a photosensitive resin composition layer on a support, wherein said photosensitive resin composition layer is obtained by shaping the photosensitive resin composition of any one of claims 1 to 7 into a sheet or cylinder,
- 15 (ii) crosslink-curing said photosensitive resin composition layer by light or electron beam irradiation, thereby obtaining a cured resin composition layer, and
- (iii) irradiating a portion of said cured resin composition layer which is preselected in accordance  
20 with a desired relief pattern, with a laser beam to ablate and remove the irradiated portion of said cured resin composition layer, thereby forming a relief pattern on said cured resin composition layer.

25 13. The method according to claim 12, wherein said ir-

radiation of the portion of the cured resin composition layer with a laser beam is performed while heating said portion.